

REMARKS

Claims 1, 2 and 4 - 6 are pending. The Specification was objected to due to its reference to deleted subject matter. Amendments to remedy this objection are included herewith and none of the amendments constitute new matter. Claims 1, 2 and 4-6 are rejected under 35 U.S.C. § 103(a) as being obvious over Japanese patent No. JP 11-012684 (hereinafter "JP '684"). Applicants respectfully traverse the rejections.

The present invention relates to a steel pipe for use in construction of buildings, characterized in that the steel pipe contains, by mass, 0.01% to 0.20% C, 0.31% to 1.0% Si, 0.1% to 2.0% Mn, 0.001% to 0.05% Al, with a balance consisting of Fe and unavoidable impurities, and has a microstructure composed of ferrite and at least one of pearlite and cementite, and further has an average size of grains of the ferrite in the microstructure of being at least 25 μm and an average size of grain of one of the pearlite and the cementite being 4 to 20 μm . When a large external force, *e.g.* an earthquake, is applied to the pipes of the present invention, the columns of the pipes support the building despite being plastically deformed.

In contrast to the present invention, JP '684 relates to case hardening steel for cold forging capable of expediting spheroidizing treatment and excellent in cold forgeability. As described in paragraphs [0001] and [0002], a case hardening steel is generally used for the manufacture of machine components rather than for building support columns. JP' 684 does not teach, show or suggest application to the construction of buildings.

Furthermore, steel materials having larger resistant force ("yield strength") against a load are likely to fracture with little deformation when the load exceeding said resistant force is applied. As a result, the building supported by such steel pipe material is subject to

collapse upon application of force. To prevent collapse, it is desirable for the steel materials to support the building by continuing the deformation thereof in order to attain tensile strength even when the force of the load applied exceeds the yield strength. As such, it is one object of the present invention to reduce the yield ratio (yield strength:tensile strength). Claim 1 discloses a steel pipe for use in the construction of buildings and “having a low yield ratio.”

JP ‘684 does not disclose or provide motivation for the decreasing of the *yield ratio* in order to prevent collapse of buildings constructed of steel pipe material, notwithstanding the Examiner’s assertion that the range of *tensile strength* disclosed in JP ‘684 “is overlapping with applicant’s present tensile strength range” (Office Action, page 3, paragraph 5, emphasis added). JP ‘684 does not disclose, suggest, or provide motivation for the decrease of yield ratio in order to prevent the collapse of buildings constructed of steel pipe material. As such, the prior art does not teach or suggest each and every limitation of independent claim 1 and thus cannot be said to render obvious the present invention. Claims 2 and 4-6, which are dependent upon claim 1, are similarly not obvious over JP ‘684.

Additionally, the steel pipe according to claims 1, 2, 4 and 5 of the present invention does not substantially contain Cr, Mo or V. These elements are known to significantly affect yield strength (and subsequently yield ratio). As such, the fact that claims 1, 2, 4 and 5 of the present invention do not substantially include Cr, Mo or V in the composition of the steel pipe further supports the aforementioned argument that the low yield ratio of the present invention is not obvious in light of JP ‘684.

Claim 6 of the present invention does contain one or more of Cr, Mo or V. The inclusion of these elements is intended to enhance the strength of the steel pipe while simultaneously maintaining a low yield ratio. In contrast, these elements are added to the

material in JP '684 for the purpose of enhancing friction resistance following working of the material into machinery parts.


Finally, increasing Si content in steel materials results in an observed increase in steel strength. The steel pipe of the present invention includes at least 0.31% Si in order to secure a basic strength property with regard to the steel material to be used in building construction. In contrast, JP '684 discloses use of 0.3% or less of Si in order to reduce deformation resistance during forging. The Examiner's assertion that "it seem [sic] a composition with 0.31% Si vs. a composition with slightly less than 0.3% would depict a mere difference in the proportion of element without any attendant unexpected results, and hence would not patentably distinguish over prior art" (Office Action, page 3, paragraph 5). However, the use of the present invention in major applications such as building support does in fact distinguish the steel pipe of the pending claims from those of JP '684, which are not applicable to use in the construction of buildings. The "mere difference" in Si content facilitates a significant change in basic strength property of the steel pipe, thereby allowing for its use in more substantial applications such as building construction. Therefore, because the quantity of Si to be used to effectuate the present invention is patentably different than that of the cited prior art reference, JP '684 does not render obvious the present invention.

For at least the foregoing reasons, independent claims 1 and 6 are not obvious over the cited reference. Further dependent claims 2 and 4-5 are patentable for at least the same reason as claim 1.

CONCLUSION

This application is now in condition for allowance. Reconsideration and prompt allowance of the claims are requested. If there are any remaining issues to be resolved, applicants respectfully request the Examiner to kindly contact the undersigned attorney by telephone for an interview. Applicants do not believe that any additional fee is required in connection with the submission of this document. However, should any additional fee be required, or if any overpayment has been made, the Commissioner is hereby authorized to charge any fees, or credit or any overpayments made, to Deposit Account 02-4377.

Respectfully submitted,
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